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CANADIAN ARCHITECT AND BUILDER.

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—THE— CANADIAN ARCHITECT AND BUILDER,

A Monthly Journal of Modern Constructive Methods,
(With a Weekly Intermediate Edition—The CANADIAN CONTRACT RECORD),

PUBLISHED ON THE THIRD SATURDAY IN EACH MONTH IN THE INTEREST OF
ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS,
DECORATORS, BUILDERS, CONTRACTORS, AND MANU-
FACTURERS OF AND DEALERS IN BUILDING
MATERIALS AND APPLIANCES.

C. H. MORTIMER, Publisher,

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64 TEMPLE BUILDING, MONTREAL.

SUBSCRIPTIONS.

The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for \$2.00 per year. The price to subscribers in foreign countries, is \$2.50. Subscriptions are payable in advance. The paper will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, will be continued until instructions to discontinue are received and all arrearages paid.

VERTISEMENTS.

Prices for advertising sent promptly on application. Orders for advertising should reach the office of publication not later than the 12th day of the month, and changes of advertisements not later than the 5th day of the month.

EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

The "Canadian Architect and Builder" is the official paper of the Architectural Associations of Ontario and Quebec.

The publisher desires to ensure the regular and prompt delivery of this Journal to every subscriber, and requests that any cause of complaint in this particular be reported at once to the office of publication. Subscribers who may change their address should also give prompt notice of same, and in doing so, should give both the old and new address.

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"ARCHITECTS and the Law" is a little publication which should prove of great use to architects—of use in not only showing them what cases it would be safe to press in the way of litigation, but also what to avoid. Mr. Gambier-Bousfield has here compiled a list of cases tried in English, Canadian, French and American Courts, and while not professing to give examples of every kind of dispute which may arise in the course of an architect's practice, the ground covered is quite extensive, as the headings indicate. We commend the work to Canadian architects as a useful one for reference, and do so all the more heartily in that it has been prepared by a member of the Ontario Association.

THE Council of the Ontario Association of Architects has had printed and circulated in pamphlet form the by-laws of the Association together with a complete register of the members arranged alphabetically and also according to place of residence, and a transcript of the Ontario Architects' Act. Toronto leads off with 73 members, Ottawa following with 19, Hamilton 11, Kingston 7 and London 5, while the members in other towns total 39, making in all a membership of 154. This number includes practically all the architects in the province, a fact which should enable the Association to ask of the Ontario Government at its next session that the much-maligned word "registered" be struck out, and only properly qualified men entering the profession through the Association permitted to call themselves "Architect."

THE proceedings of the Council of the Province of Quebec Association of Architects, printed in this paper, indicate that active efforts are being made to achieve the fulfilment of the objects which the Association set out to accomplish. The numerous applications for membership on the part of architects and students are extremely gratifying, and may be taken to indicate that the organization is felt to be necessary, and the objects which it is seeking to attain such as are calculated to promote the progress and welfare of the profession. The Association is to be congratulated upon having secured suitable rooms for the exclusive use of its members. The means should be provided to render these rooms a centre of architectural interest, especially to students. The success which has attended the Toronto Architectural Sketch Club would suggest the desirability of a Montreal institution conducted on somewhat similar lines.

A LEADING lumberman in an interview with a representative of the *Canada Lumberman*, is reported to have said that the shingle mills throughout the country are working day and night owing to the strong American demand for shingles. American architects and builders are said to have discovered that tin and galvanized roofs such as they have been using of late years, do not possess the necessary weathering qualities, and that in consequence of this discovery they are reverting to the use of wooden shingles. Sixteen inch shingles are said to be in most demand, and prices are rising. We should be pleased to know what has been the experience of Canadian architects and builders with the various kinds of roofing materials. An enquiry reached us a few days ago from an architect in one of the smaller cities for information as to the merits of asbestos roofing. It was learned that in the city of Toronto asbestos is not being employed to any extent, if at all, for roofing purposes, having, it is claimed, been found to be an unsatisfactory material for the purpose.

THE necessity existing for the periodical inspection of passenger elevators, as well as hoists in warehouses, factories, etc., was referred to in these columns on a previous occasion. The rapid rate at which these contrivances are multiplying, and the probability that the serious accidents which have happened in connection with their operation in the past will increase in equal ratio in the future, renders proper supervision of them a matter of growing importance. Any provision which may be made for the protection of life in this direction, should have regard to the danger arising from elevators and hoists being placed in charge of lads and even children. There are many buildings where with a view to lessening expense a child is thus employed to do the work which should only be entrusted to an adult. The tendency to increase the speed of elevators must also result in aggravating the danger from inexperienced and careless management.

CITIZENS of Toronto may be congratulated on the outcome of the negotiations of the Council with the telephone company. The demagogues of the Council aforesaid used their utmost endeavors to have an unconditional franchise granted to an opposition company, but it is fortunate that the older and wiser heads were able to command a sufficient majority to defeat the destructive scheme. The offer of the Bell Telephone Company to pay into the City Treasurer four per cent. of their gross receipts, to materially enlarge the scope of their underground operations, to supply telephone facilities to private residences at a reduced rate, as well as offering facilities in their conduits for city wires, was an eminently fair and business-like one. It would have been a great pity to have lost all these advantages, besides burdening the business man with a double telephone service and having the streets crowded with another set of poles and wires, but that is a consummation the citizens of Toronto have only missed by a very narrow chance, thanks to the peculiar constitution of some of the gods that the people have chosen to rule over them.

WE commend to civic authorities in Canada the example set by the city of Boston which has recently established an ordinance regulating the laying out of new streets. Henceforth all new streets are to be laid out in accordance with a plan to be established by a Board of Survey, which also fixes all street lines and grades. By this means comprehensive plans may be carried out, if not all at once, yet with a definite end in view. Numerous opportunities for grand avenues and noble streets have been lost—in Toronto, for instance—for lack of this much needed supervision. One has only to look at a plan of the city in order to become disgusted by the piecemeal method which has characterized the extensions and growth of the metropolis of Ontario—streets stopping abruptly, jumping a block and then continued, streets with a jog of one-half their width, streets beginning and ending nowhere, lots having an abnormal depth and others too shallow. The by-law accepting no street under a certain width was a step in the right direction, and put a stop to a fast-growing evil. We hope the City Engineer will sharply scrutinize all new surveys with an eye to the future, and would be glad to see some such board established in Canada.

DISPUTES of all kinds have arisen in connection with building enterprises—some between architects and their clients, some between owners and contractors, others again between contractors, sub-contractors, and workmen. Thus precedents can be found in the records of the decisions of the courts, for the settlement of almost any disagreement which may arise. The city of Hamilton is at present the scene of a dispute, however, for which we find no precedent, and the termination of which, should it find its way into the courts, will be looked for with interest. The city having decided to turn the grounds heretofore used for exhibition purposes into a park, disposed of the exhibition buildings to a Mr. Walton, who employed a contractor named Scott to take them down. While engaged in doing so the workmen came upon a number of American and Canadian coins which had been placed in the corner stone of the structure at the time of its erection. These coins were appropriated by the caretaker and the workmen. Mr. Walton it appears had likewise counted upon becoming their possessor, and when the time came for a settlement with the contractor,

finding they were gone, he deducted \$20 as their value. The contractor protested against paying the amount, whereupon Mr. Walton reduced his claim to \$10. This demand was likewise rejected, the contractor being willing to pay only 86 cents, the intrinsic value of the coins. It is said that the courts will probably be asked to adjust the dispute. There can be no question as to the ownership of the coins. This the contractor appears to recognize. The decision will turn upon their value, and the value will be likely to depend largely upon their antiquity.

THE inability of the average municipal corporation to successfully conduct a business enterprise, is receiving one more exemplification in the case of the Toronto Street Railroad. Though it has been a little over a month in the hands of the city, the receipts have shown a falling off of over a thousand dollars by the time they have reached the city treasury as compared with the same period last year, the expenses have increased fifty per cent., the cars are dirty and uncomfortable, and the state of the roadbed is simply villainous. Unless the railroad is speedily handed over to a private corporation the chances are that in a short time there will be no railroad to hand over. There have been handsome offers by a syndicate of citizens to take the property and pay the amount of the arbitrators' award and a handsome sum per year for the franchise, with an undertaking to make the change from horses to electricity within two years. Why this offer is not accepted is a mystery. Its acceptance would mean the expenditure of two millions of private funds in the work of construction. One of the largest steam and electric plants in existence would be at once installed, and a rapid and comfortable service given to the citizens. The success of the electric method of propulsion is now demonstrated beyond question, and the citizens should no longer be deprived of its advantages. The overhead method of construction would have to be employed, as nothing successful has as yet been evolved in the way of a conduit, but while properly constructed, it need not be considered a permanency, as it could be changed in the future if the development of the art ever permits of its being done. Let the Mayor and Council respect the pledge they gave the people when the funds to purchase were provided, that the city would in no case attempt to run the road, and hand it over to the company who will pay the most for the privilege, with the undertaking to provide electrical rapid transit at the earliest possible moment.

DECIDED advancement has taken place in domestic architecture in Canada, particularly in the larger cities, during the last decade. The introduction of new and improved materials has had considerable to do with the results achieved. It is possible for the architect who is the possessor of good judgment and a cultivated taste to obtain agreeable effects in his buildings at an expenditure far below what was required fifteen or twenty years ago. The variety of "ready-made" materials placed at the architect's disposal in the present day cannot, however, be regarded as an unmixed good. They tend to make him feel that he is relieved by their use from the necessity of giving that personal study and attention to the details of his building which was so important a part of his duties under former conditions. In the hands of unskilled architects many of these new materials are a positive injury. The prevailing ambition of this class of architects is to obtain novel and striking effects. The dignity resulting from breadth of treatment is entirely overlooked, as they crowd their walls with ornament until the effect resembles that of a piece of patchwork. In Toronto at least, the improvement in the character of the buildings erected for business purposes cannot be said to be keeping pace with that exhibited in the residence districts. On thoroughfares such as Spadina avenue, which are destined to be centres of business, buildings are being erected that from an architectural standpoint are an eyesore to passersby. Here may be observed façades in which carved stone, pressed and moulded brick, galvanized iron corbels and cornices are arrayed in a manner which results in ugliness so obtrusive, as to make one wish that the means were at hand for inflicting deserved punishment upon the author. When every architect shall have learned to use and not abuse, the almost endless variety of materials entering into building construction in the present day, the results attained will come nearer to being universally satisfactory.

WE publish elsewhere in this issue an abstract of a paper on "House Sanitation" by Mr. Willis Chipman, C. E., Toronto, which was prepared for the Association of Executive Health Officers of Ontario. The suggestions contained therein are more particularly applicable to small towns, villages, and the poorer districts or suburbs of cities, and the advice given is eminently practicable. The writer has shown that the poor man may be supplied with sanitary conveniences sufficient for his needs, and that cities and towns may improve their sanitary conditions without oppressing him by excessive taxation and without any great expenditure. The "Brantford plan" of earth or ash closet is recommended for localities desitute of sewerage, or where for reasons of cost or otherwise a system of plumbing is impracticable. This method should be adopted in the tenement districts of Toronto where there are more than 12,000 privy pits, and where it would be impossible to introduce water closets by reason of exposure to frost. We must confess to being rather sceptical in regard to the inoffensiveness of an ash closet which is only emptied once a month, except where the users are of exceedingly careful disposition, and fear the closet where only average care was bestowed would prove decidedly offensive in very warm weather. In Lorne Park where a similar system is in use, we understand the removal is tri-weekly for the very reason cited above. The disposal of garbage by burning in the kitchen stove is another point which it is almost impossible to observe in practice. Not one domestic in fifty will attend to it faithfully, and many careful housekeepers will not permit it, averring as a reason that it is decidedly injurious to the range. A method of cellar drainage is recommended which is incomplete in that it makes no provision for keeping the trap supplied with water in seasons when there is not sufficient subsoil water flowing to preserve its seal. A rain water pipe should be connected to this trap to prevent such a contingency. The proposal to "ventilate" the w. c. compartment of a house into the "cock loft" is a most ostrich-like proceeding. If the room cannot be ventilated into a warm flue it would be better to make it airtight and to rely for ventilation on a small window opening directly to the outer air. The pamphlet is a contribution to sanitary science which must prove of decided benefit in the direction intended, and we commend its perusal to the local authorities and health boards of the country.

TORONTO ARCHITECTURAL SKETCH CLUB.

THE season's work was brought to a close on Tuesday evening, June the 24th, by a social gathering held at the Toronto Art Gallery. The members turned out in large force and a number of visitors were present, including members of the Ontario Society of Artists and Art Students' League. Songs, recitations, ventriloquism imitations, instrumental selections, smoking and light refreshments were the means of making the evening pass very pleasantly. Those who contributed to the first part of the programme were: Messrs. L. Carlisle, J. J. Woolnough, Henry Simpson, J. A. Pearson, — Fairweather, C. H. Westwood, J. F. Brown, E. B. Jarvis, W. Carlisle, H. D. Allardyce, R. Wilson, Sam. Jones, — Smith, J. L. Telford, and Acton Bond.

Late in the evening the meeting broke up, after "Auld Lang Syne" and "God Save the Queen" had been sung in a hearty manner.

THE MONTREAL BOARD OF TRADE BUILDING.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—I was pleased to see the accepted design for the Montreal Board of Trade building published in your last issue, and also to see in the same number a view of the Toronto office of the Bank of Montreal. We are thus enabled to compare the work of local men with that of foreigners—and to compare it, I think, without detriment to our own men.

I must confess to a feeling of genuine disappointment when I opened the journal and found such a commonplace design as that which was accepted by the Building Committee of the Montreal Board of Trade. To me, it has not one redeeming feature. It is merely a transcript of some of the successful firm's designs for warehouse buildings which have been published frequently in the American architectural journals—lifeless—commonplace—*artless*. It is not even sound in construction, the massive front wall being carried on stilts, and the ground

floor front wall advanced several feet in order to gain increased space in the offices on either side of the main entrance.

Compare the above design with that of Messrs. Darling & Curry's Montreal Bank, and there can be no question of the superiority of native talent. The one is a studied, artistic production, indicating a carefully trained mind; the other is a crude effort tossed off apparently by a man who has run short of ideas and repeats some of his old ones regardless of suitability or the artistic possibilities of the occasion.

Yours, &c.,

CANADIAN.

PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

AT a meeting of the Council called on the 2nd of June to receive report of Committee, applications for membership, etc., there were present: J. W. Hopkins, President, in the chair; A. T. Taylor; A. F. Dunlop; A. C. Hutchison; W. E. Doran, Treasurer.

The Committee on the preparation of a schedule of charges laid what they had prepared before the meeting. After some considerable discussion it was thought desirable to adjourn the meeting until the 8th inst., to try and get a larger attendance. The meeting adjourned accordingly.

At the adjourned meeting on June 8th, there were present: J. W. Hopkins, President, in the chair; V. Roy, 2nd Vice-President; A. C. Hutchison, A. F. Dunlop, A. T. Taylor, M. Perrault, A. Raza, W. E. Doran, Treasurer; C. Clift, Secretary.

The Committee on schedule of charges again reported, and after the schedule had been thoroughly discussed, it was temporarily adopted.

The following applications for membership were received and accepted: O. Mailloux, St. Antoine street, Montreal; Thos. Raymond, St. Roch, Quebec.

Applications were received from the following students: A. Lefort, E. Heckok, A. Piché, S. Trappier, A. Content, A. Kaich, A. St. Louis, R. LeMay, D. N. MacVicar, C. S. Martel, J. Z. Despartie.

An application from D. A. Sincennes was received and accepted, but the Secretary was instructed to write saying the balance of his time must be served in the office of a member of the Association.

An application for membership was received from J. A. Thibandeau. The Secretary was instructed to write him asking him to have it signed by a member of the Association, and to send the registration fee of \$20.

Messrs. Roy, Dunlop, and the Secretary were appointed to obtain rooms for the Association as soon as possible.

Several matters of business had to be left over.

The meeting adjourned until Monday, June 15th.

There were present at the adjourned meeting on June 15th: J. W. Hopkins, President, in the chair; A. C. Hutchison, J. F. Peachy, A. T. Taylor, A. F. Dunlop, C. Clift, Secretary. After the confirmation of the minutes, the Secretary reported that the schedule temporarily adopted at the last meeting had been sent down to Quebec for perusal by Messrs. Berlinquet and Peachy, and that no alterations had been suggested.

It was moved by Mr. Taylor, seconded by Mr. Hutchison, that the schedule be finally adopted and the Secretary at once have it sent down to Quebec in accordance with the Act of Incorporation, and that Messrs. Berlinquet, Peachy and Baillairge be instructed to see it laid before the Lieutenant Governor for his sanction. Carried.

The Committee appointed at last meeting to arrange about securing rooms reported that they had visited several places, and after careful consideration had engaged the two front rooms on the second floor of the Canada Life building at a rental of \$200 per annum.

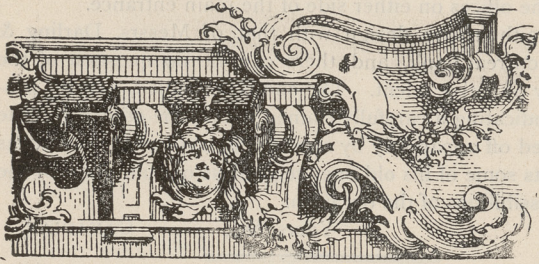
The Council sustained the action of the Committee. The Secretary was instructed to at once have them furnished sufficiently for the use of the members and students.

The Secretary asked that architectural periodicals be at once obtained for the use of the students, etc., whereupon he was instructed to apply to the editors of the different journals.

The following applications for membership were received and accepted: A. Léveque, Place d'Armes Square, Montreal; A. Vallee, Quebec; A. Dubieine, Quebec; H. C. Nelson, R. P. Baines, Ed. Maxwell, Montreal. For student associates: G. R. Crood, D. R. Talbord, J. G. Laurent, Montreal; E. Dusseault, Quebec.

Several applications were left over to another meeting.

MOUNTING DRAWINGS.



THE following practical suggestions on mounting of drawings are given by our London contemporary,

The Illustrated Carpenter and Builder:

To begin with, a paste of good quality is required. When paste is made at home, trouble often arises from scorching, or from the addition of too much water. Thoroughly made paste, when spread on paper, will not strike through, but will remain on the surface, like butter on a piece of bread. To enable the paste to keep for several months in a cool place, add dissolved alum as a preservative, in the proportion of a tablespoonful of pulverized alum in two quarts of warm or hot water.

Put the water in a tin pail that will hold six or eight quarts, as the flour, of which the paste is made, expands greatly while it is boiling. As soon as the water has cooled, stir in good rye or wheat flour until the liquid has the consistency of cream. Beat thoroughly with a paddle-shaped stick, and see that every lump is crushed before placing the vessel over the fire. Care should be exercised to have the water cool before adding the flour, otherwise the paste will be lumpy.

To prevent scorching the paste, place on the fire a pot or kettle partly filled with water, and set the pail containing the paste materials in the water, permitting the bottom to rest on a few large pebbles to prevent excessive heat. Of course, a "fairna kettle," or "double boiler," is better, and will be less troublesome to handle, but the "ruling element" of the kitchen will not always permit its use. Add a teaspoonful of powdered resin, a few cloves tied in a cloth, so that they will flavor and not discolor the paste, let it cook until it assumes the consistency of "mush," then, if any lumps appear, strain through a sieve. Keep in a tight jar, and if it becomes too thick after standing, put the quantity required in a suitable dish, and thin by adding cold water and stirring thoroughly.

So much for the paste. Now let us proceed to the mounting. Cut the cloth from one inch to two inches larger all around than the drawing or paper to be mounted. Lay it on a drawing-board or table, damp well with a sponge, stretch lightly, and tack down; use small tacks, and place them four or five inches apart, or closer if necessary.

Leaving it for a moment, and while its surface is evaporating and absorbing the surplus dampness, lay the drawing, map or paper to be mounted face downward on another table, and dampen the back with a wet sponge. Returning to the cloth, with a brush (a large, round, fine-haired paint brush is best) lay the paste on evenly and smoothly, and then, after the surface is well covered, take the brush and beat the paste thoroughly into the pores of the cloth. After this is done, smooth the surface nicely.

Take up the paper by the corners, and if the thickness of the paper seems to require it, apply the sponge again. The paper should be limp, but not wet. If it is not well prepared, my experience has been that the surface will "blister," particularly on large drawings, for the paste adheres much better to a damp surface than to a dry one.

At this stage it is best to obtain some assistance. Have your assistant grasp two of the corners of the drawing or paper while you manage the others, holding the paper suspended horizontally a few inches above the cloth. When it is in the right position place your end on the paste-covered cloth, while your assistant still holds his end up. Place a piece of clean paper on top to prevent smearing the sheet, and with the hands brush quickly from the middle of the end towards both sides working constantly towards your assistant as he slowly lowers the paper to the cloth. Rapid manipulation is necessary to ensure perfect contact and a smooth surface.

Should any "blisters" develop, rub them briskly with the bone handle of an eraser, or any similar substance. Small undulations will disappear when the cloth dries. Stand the board aside with the cloth tacked to it, and allow to dry, then cut off as required.

Ordinary bleached cotton cloth or sheeting makes a good backing for small sheets, while large ones are best mounted on a heavy grade of unbleached material. These directions are general, and have been found to work well in practice. Individual experience can alone, however, determine many of the details.

Other paste than that described may be used if desired, though it is doubted whether a better can be obtained. Should any of your readers know of a better method, many would doubtless be glad to hear of it.

PUBLICATIONS.

"According to St. John" is the striking title of Amelie Rives' latest novel, which will begin in the August number of the *Cosmopolitan Magazine*. This lady's startling debut in the literary field three years ago is not yet forgotten by the reading public, followed as it was by her marriage and retirement from active work, only occasional rumors being heard that she was employing her more mature mind in originating something of a higher order than that attempted in her earlier efforts.

The issue of the *Dominion Illustrated* for July 4th, has a fine account of a fishing trip by Douglas Sladen, the poet, on the north shore of Lake

Superior, in that wild, grand, and picturesque region opened up by the C.P.R. Miss McLeod, whose reverent pilgrimage was so delightful a series of letters, contributes a charming article on Balmoral and the Highlands, illustrated by views of the Queen's favorite residence as seen from the river. "My First Twenty-Four Hours in a California Mining Camp" recalls vividly the famous days of the 'forty niners. There are many fine engravings and much bright reading matter in this issue. The *Dominion Illustrated* is a delightful weekly visitor that should be found in every cultured home.

PERSONAL.

Mr. F. W. Doan has been appointed to succeed Mr. E. H. Keating as City Engineer of Halifax, Nova Scotia.

Mr. Louis Bacque, Canadian agent of the Colman-Hamilton Company, was married a few days ago in Toronto to Miss Hattie Scott, second daughter of Mr. Hugh Scott. Mr. Bacque and his bride are at present honeymooning in the United States.

OUR ILLUSTRATIONS.

COTTAGES ON NASSAU STREET, TORONTO, S. H. TOWNSEND, ARCHITECT, TORONTO.

The materials used are dark color brick, shingled gable, oriels of wood, Credit Valley stone sills, heads, corbels, &c. Each cottage contains two parlors, 23' x 12'; drawing room, 13' x 15'; kitchen, 12' x 12'; pantry, 6' x 5'; three bed rooms, bath room, closets, &c., on first floor; three bed rooms, on upper floor; cellar and laundry in basement. Cost of pair, about \$4,500.

PHOTOGRAPHURE PLATE—RESIDENCE OF SIR DONALD SMITH, MONTREAL.—MESSRS. HUTCHISON & STEELE, ARCHITECTS, MONTREAL.

ALTAR IN THE CHURCH OF OUR LADY OF LOURDES, TORONTO.—CAPT. FREDERICK C. LAW, ARCHITECT, TORONTO.

NEW LIBRARY BUILDING, TORONTO UNIVERSITY.—MR. D. B. DICK, ARCHITECT, TORONTO.

TORONTO ARCHITECTURAL SKETCH CLUB COMPETITION FOR "A STAIRCASE IN WOOD"—DESIGN BY MR. MURRAY WHITE, AWARDED FIRST POSITION.

CONSTRUCTION OF ABBATOIRS.

As Toronto and other Canadian cities are considering the erection of public abbatoirs, the following recommendations, as to the points to be observed in their construction, contained in a recent report on the subject by the Borough Surveyor, of Brighton, Eng., may prove to be of value:

Construction of the floor and the drainage.—The whole surface of the land devoted to the purpose of an abbatoir should be covered with an impervious pavement arranged so that it may not become slippery; laid to proper falls with open drain channels leading to one common underground drain outside the buildings. This drain should lead to a catch-pit removed as far as possible from the buildings and having an overflow outlet to the sewer. The object of this catch-pit is to intercept all solid matters. It should be easily accessible and emptied daily.

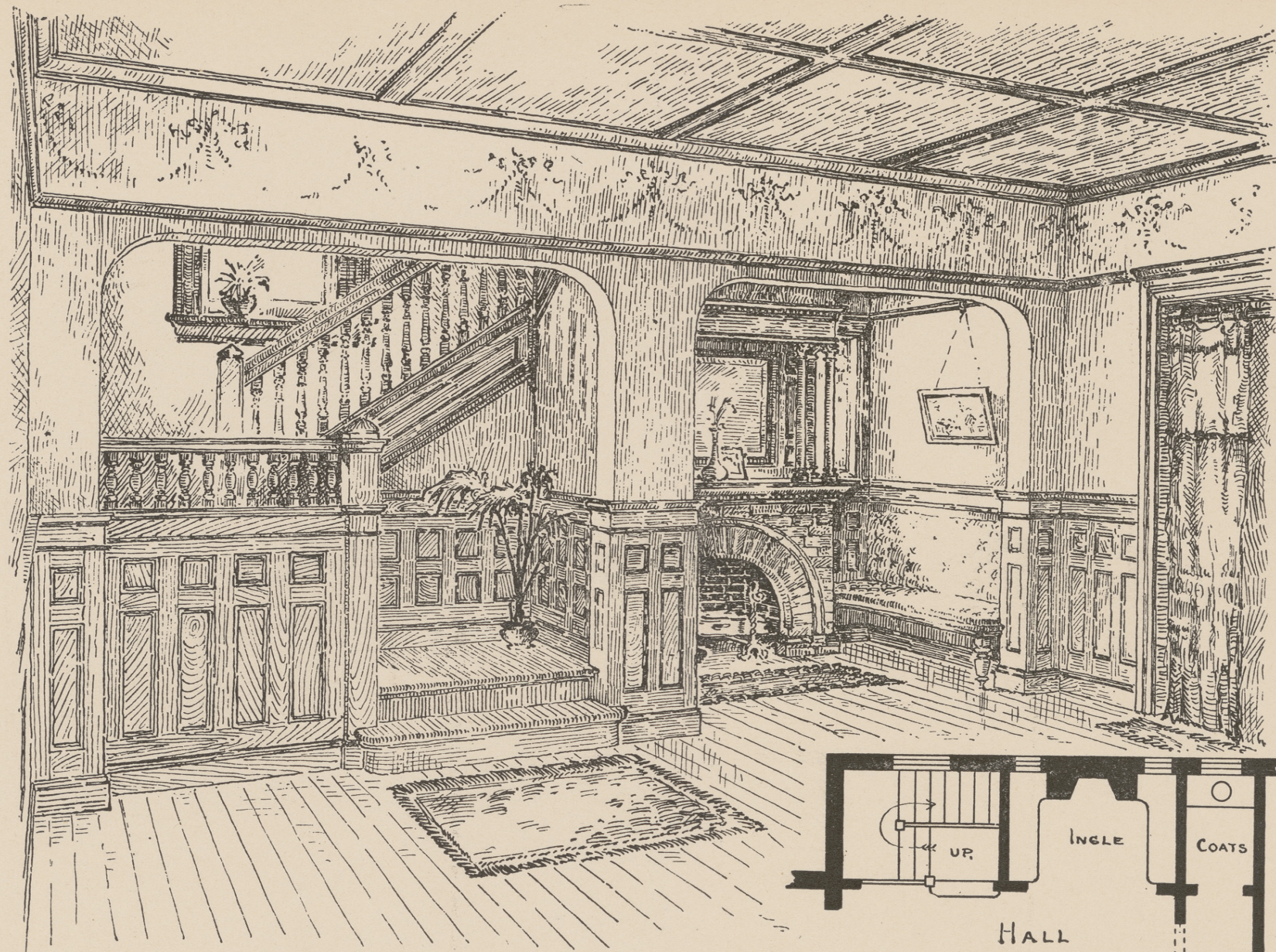
Construction of the walls of the slaughter houses internally.—These should be as smooth and as free from joints as possible; finished with a smooth rendering of cement is the most preferable method. The walls of the cooling-room should have glazed bricks up to a height of eight feet from the floor.

Ventilation.—This should be as open and as free as possible both in the ridge of the roof and in the side walls, and otherwise where practicable by means of louvres, grilles, &c.

Water supply.—A very plentiful supply is one of the most essential conditions to secure a satisfactory degree of cleanliness in every department. Taps must be numerous, conveniently placed and very strong. A storage tank should be provided for use in the event of the main supply being temporarily cut off.

The boiler house, to provide hot water for use in the general slaughter house, and steam to heat the water in the pig slaughter house, as well as the hide and skin shed, should be arranged separately from the other buildings, and as remote as possible from the cooling rooms for carcasses. A covered manure shed should be as conveniently near the last-named buildings as can be, and the corporation should undertake to clear its contents daily.

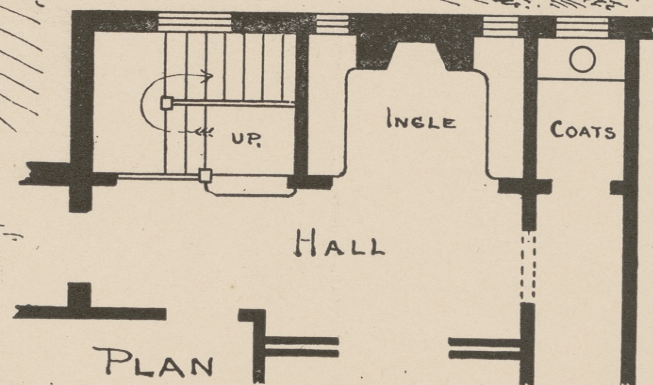
Fodder store, offices, room for workmen, should also be arranged as a separate block of buildings, and should embrace ample and suitable stores for fodder, offices for the superintendent and for the butchers, with lavatory and other accommodation, and a waiting-room for the workmen wherein they may have their meals and refreshments. Residence for the superintendent and one helper should be provided on the site.

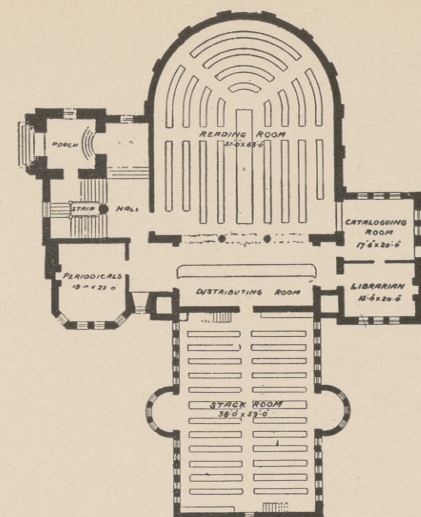


T.A.S.C. COMPETITION
FOR A STAIRCASE IN WOOD.

TORONTO ARCHITECTURAL SKETCH CLUB COMPETITION FOR "A STAIRCASE IN WOOD."

DESIGN BY MR. MURRAY WHITE, AWARDED FIRST POSITION.



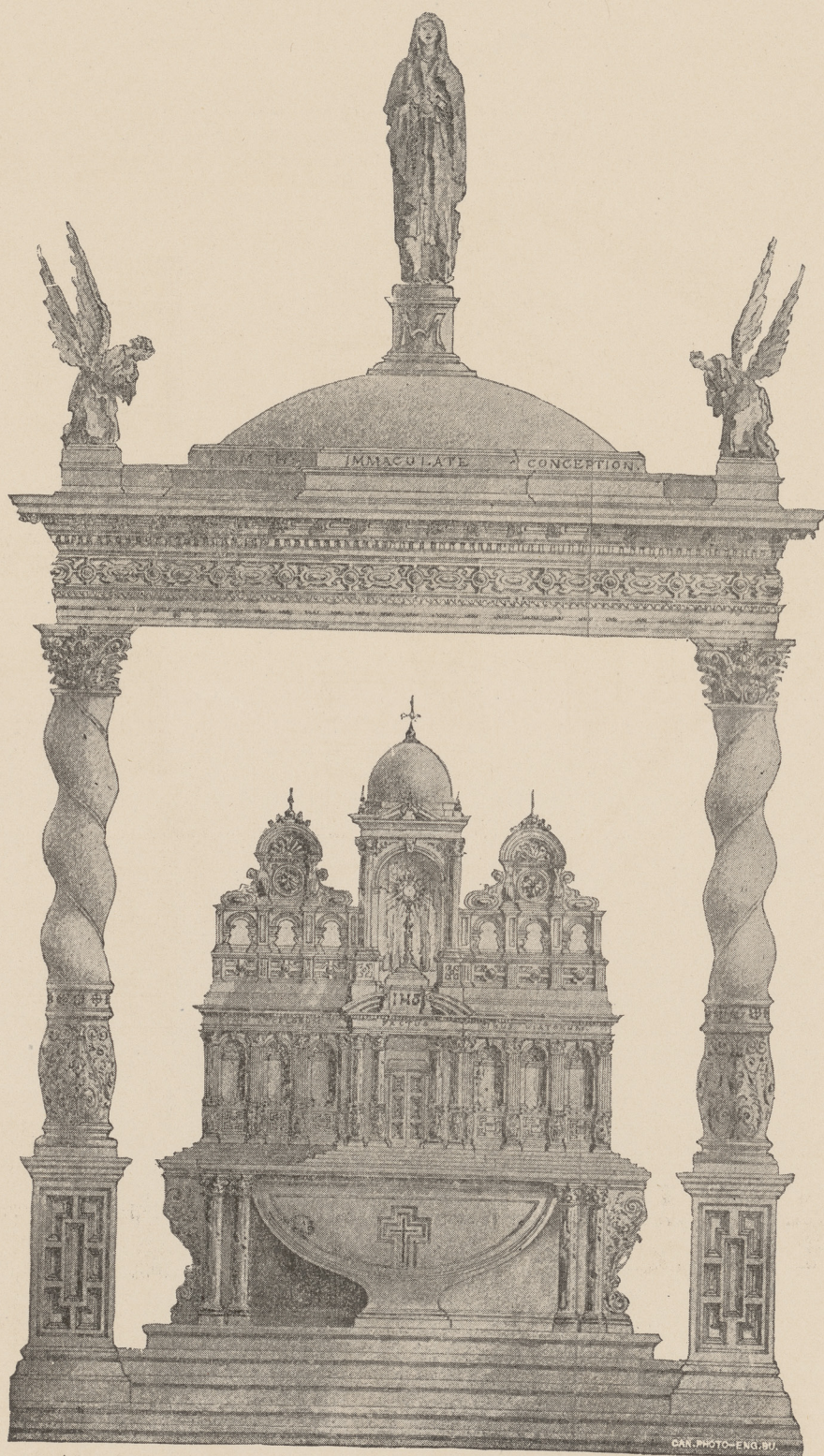


GROUND FLOOR PLAN



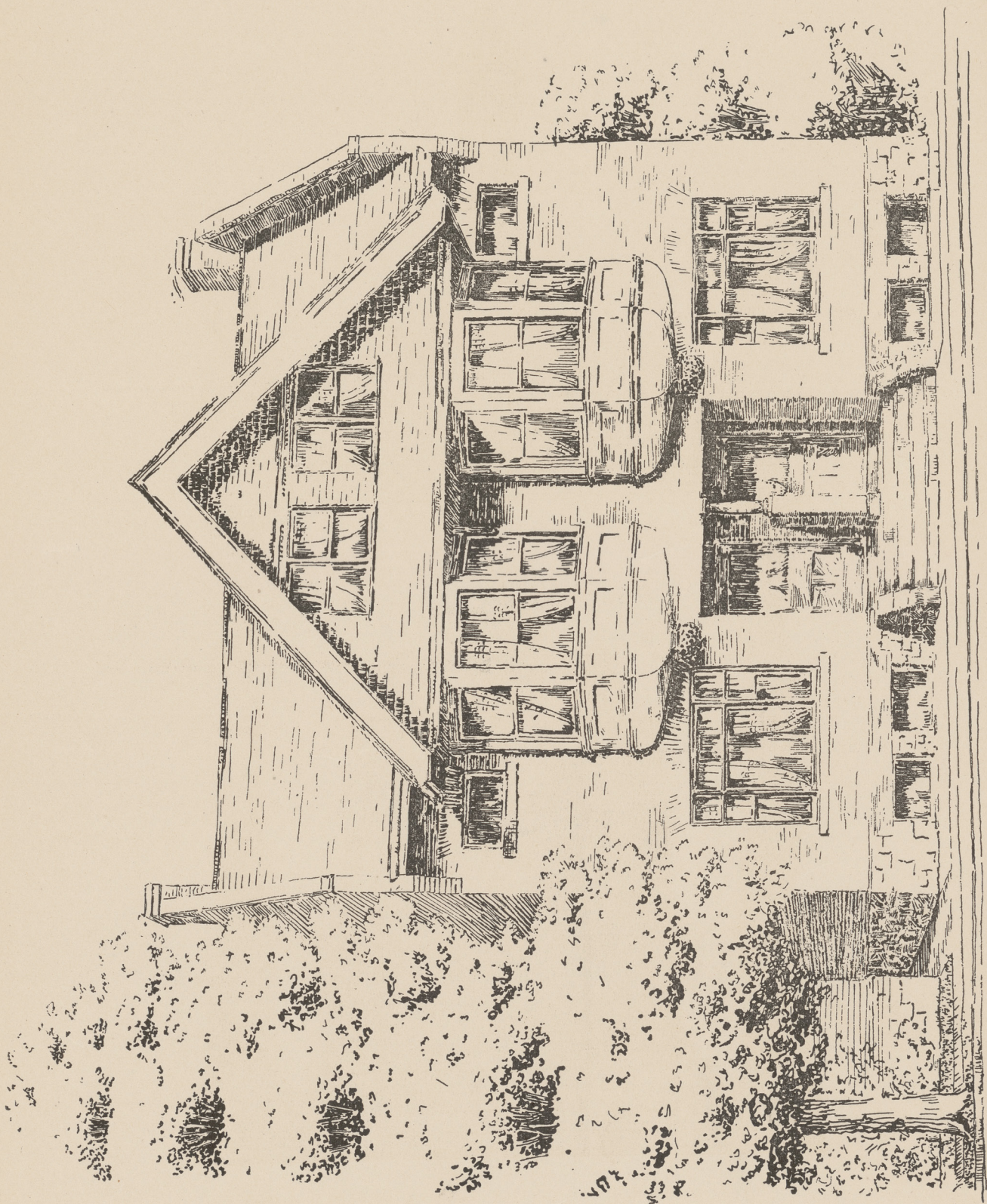
NEW LIBRARY BUILDING, TORONTO UNIVERSITY.

MR. D. B. DICK, ARCHITECT, TORONTO.



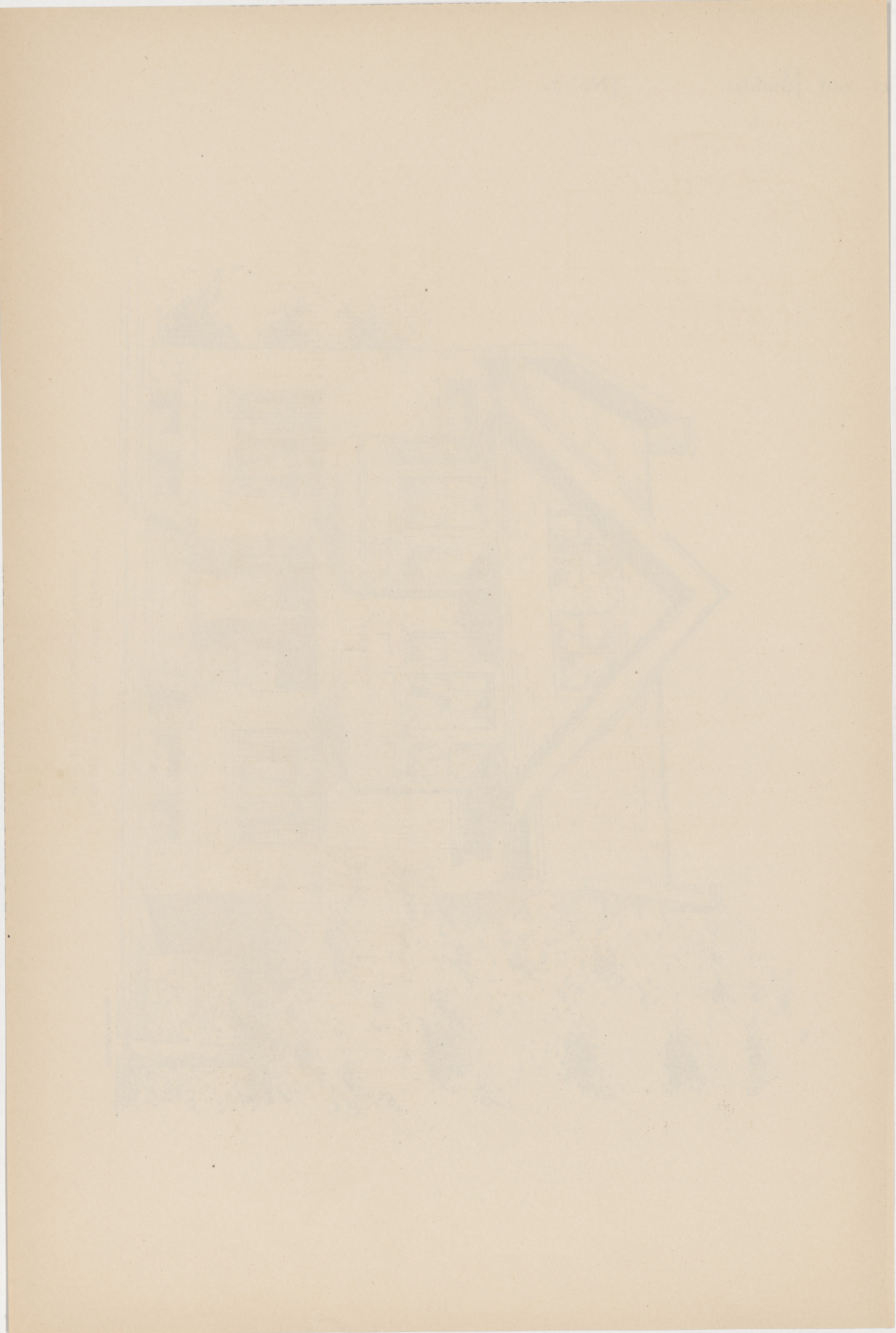
ALTAR IN THE CHURCH OF OUR LADY OF LOURDES, TORONTO.

CAPT. FREDERICK C. LAW, ARCHITECT TORONTO.



COTTAGES ON NASSAU STREET, TORONTO.
MR. S. H. TOWNSEND, ARCHITECT, TORONTO.

CAN. PHOTO-ENG. CO.



SANITATION IN BRANTFORD

"SOME SUGGESTIONS ON HOUSE SANITATION."*

THE following schedule shews at a glance the methods the writer would recommend for dealing with domestic and household wastes in different classes of buildings; also the prime cost of connecting with the street sewer and the cost of the necessary plumbing fixtures.

In the majority of cases one house sewer, one outside sink, and one yard hydrant would answer for several houses, thus greatly decreasing cost to each house as here given.

Economical and efficient removal from different classes of buildings.	Cheapest tenements monthly rental not exceeding \$5.00.	Houses in which the monthly rental does not exceed \$12.00.	Houses in which the monthly rental does not exceed \$20.00.	Houses in which the monthly rental does not exceed \$40.00.
(a) Liquid house wastes.				
1. Kitchen water (fatty)	Slop sink outside the building	1 Kitchen sink	1 Kitchen sink	1 Sinks.
2. Washing " (soapy)		2 " "	2 " "	2 Baths, wash-bowls & sink
3. Chamber slops.....		3 Slop sink outside.	3 Water closet	3 Water closets
(b) Night soil.....	Earth or ash closet.	Earth or ash closet.	Water closet.	Water closets
(c) Kitchen garbage....	Burned in kitchen stove in whole or in part.			
(d) Ashes	Carted away as often as possible with the refuse that cannot be consumed.			
(e) Subsoil water.....	Removed by porous agricultural drain tiles.			
Cost of house sewer....	\$18 00	\$18 00	\$10 00	\$10 00
" plumbing fixtures	\$12 00	37 00	125 00	180 00
Total first cost.....	\$30 00	\$ 5 00	\$135 00	\$190 00

In houses indicated in the second and third columns of the above schedule the annual cost for odorless excavating and for removal of garbage and surplus ashes should not exceed \$2.50 per year. In houses of the class mentioned in the last two columns there will be the additional charge for extra water required to flush the water closets, and other fixtures.

The cost of house sewer does not include the cost of that part of house sewer between the street line and the street sewer.

We will now describe the fixtures mentioned.

THE OUTSIDE SLOP SINK.

This slop sink should be of iron, preferably galvanized, and should have a cast iron outlet pipe 3 inches in diameter furnished with a deep trap of the same diameter placed from 3 to 4 feet below the surface of the ground (beyond the effect of frost). The ordinary "Merry Sink," 21 1/2 inches long, 17 inches wide and 9 inches deep, to be had from all dealers in sanitary fixtures and illustrated in Fig. 1, answers admirably as it has no corners within that can retain dirt or filth, and the screen over outlet is large and

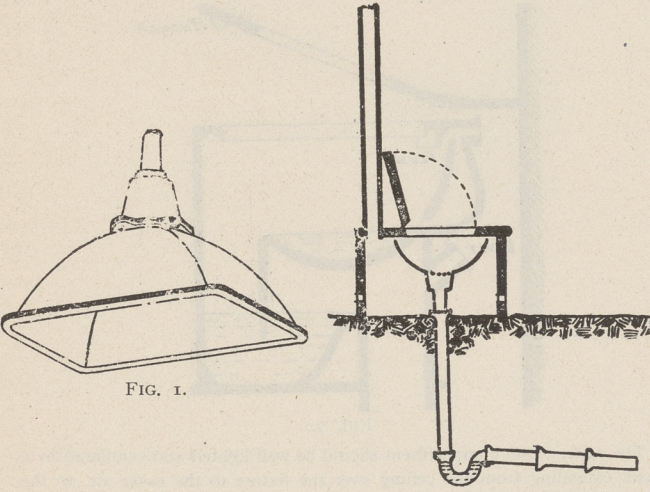


FIG. 1.

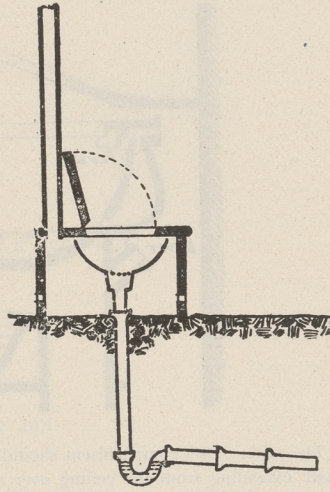


FIG. 2.

exactly suited for use required. This sink should be covered with a strong box of wood with hinged cover to protect the sink from injury. This box and enclosed sink should be ventilated by boring several holes through the box near the surface of the ground and by carrying a ventilating shaft of wood or sheet metal from the top of the box to some convenient height above the ground away from windows. This sink should be thoroughly and frequently scrubbed, and to prevent improper use of sink the screen or strainer placed over the outlet must be permanently fixed.

Unless kept scrupulously clean this outside slop sink should not be placed in any building or shed, but it may be placed at one side of an outside building; the ventilating shaft being carried up the side of the building. A roof may be built over the fixture if desired.

* Abstract of a paper prepared for the Association of Health Officers of Ontario, by Willis Chipman, C. E.

If roof water is permitted to enter the sewer system it would be advisable to allow one rain water leader at least to discharge into this sink.

The yard hydrant for water supply should be located so that drip and water can be readily conveyed to this slop hopper.

THE DRY EARTH OR ASH CLOSET.

"The dry earth or ash closet used for the "treatment" of night soil should be built according to the 'Brantford' plan. Fig. 3 shows the style of closet generally used in Brantford, where there are now about 1,300 in use. Movable drawers, boxes or pails are not used, because in this climate a little moisture freezing in winter makes their removal or emptying difficult. The box is therefore fixed and can generally be arranged so as to be emptied with a shovel by a door or lid in the rear, as shown in the figure.

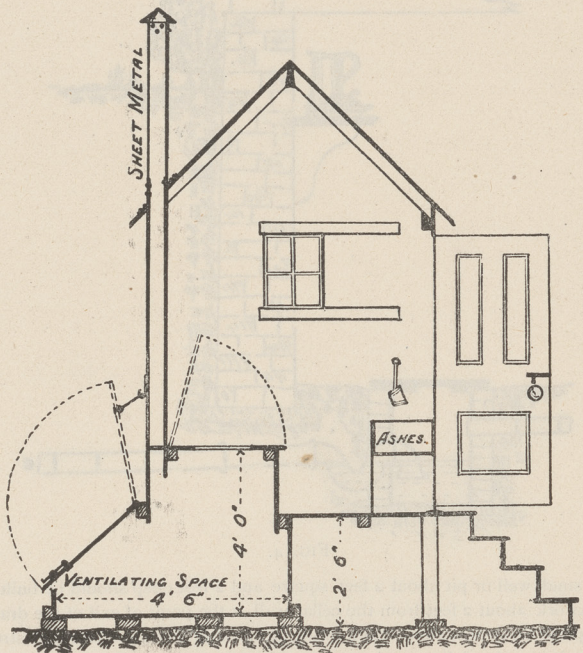


FIG. 3.

The boxes are made of lumber. A moderately tight box, not sunk in the ground, where no slops are thrown in, good ventilation provided, and a little dry earth or coal ashes thrown in at each use, or even once daily, will not become offensive and will last for half a lifetime. This closet is very cheap. Old privies can easily be changed into ash closets by emptying and cleaning the pits and filling them with clean earth, then raising the structure about two feet, placing the box under and providing a couple of steps. In many places in Brantford they are built under back sheds, etc., with access from the house.

An ample box should be provided within the closet for the coal ashes or dry earth, also a convenient scoop or dish for their application. Dry earth (top soil, never sand) is assumed to be the proper application, but in practice it is little used, being not ready to hand as the coal ashes usually are, and being often not dry. The coal ashes should be kept under cover, they need not be sifted. Wood ashes in practice are found to be offensive. In the public schools in Brantford a shovelful of coal ashes is thrown down each opening once a day by the janitor after the school is closed, and after six years' experience these school closets are proved to be as inoffensive as the best arranged water closets.

These ash closets make no provision for liquid refuse, and it is imperative that no chamber slops or kitchen refuse should be thrown into them. The disposal of such liquid fluid should be by the outside slop sinks connected with drains or sewers. Where there are no such drains or sewers the disposal of such liquid refuse is, in crowded neighborhoods, a difficult problem, and it is not the purpose of this paper to speak of the many expedients resorted to for solving it.

The dry ash closets should be emptied once a month for an ordinary family service or for schools. In other cases a more frequent service may be necessary.

The cost of a monthly service is in Brantford \$1.80 per annum. The average distance to the dumping ground being about 1 1/2 miles. One man with a one-horse cart easily attends to 600 closets. It is absolutely necessary that a systematic and efficient contract service be provided.

It may be added that while serious difficulties exist in providing dumping grounds for the contents of privy pits and cesspools, no difficulty whatever has arisen as to the dumping of contents of dry ash closets, such being readily disposed of upon market gardens.

In those of our cities already well provided with sewers, thousands of noisome privy pits still exist. (There are over 12,000 in the city of Toronto.) The expense of introducing water closets in the cheaper tenements, the want of a suitable place to locate them where they would not be affected by frost, and the additional water rates required for flushing them, prevent their erection in such tenements. The systematic introduction of dry ash closets in these cases in conjunction with the outside slop sinks offers an effectual means of abating this widespread and dangerous nuisance."

GARBAGE.

Combustible garbage can be burned in the kitchen stove, and the ashes

not needed for the closet, together with the incombustible garbage and refuse, should be removed periodically by carts.

CELLAR DRAINAGE.

Cellar drainage can be best secured by keeping out surface waters by proper ditches and channels, and by lowering the subsoil water by the use of porous agricultural drain tile as shown.

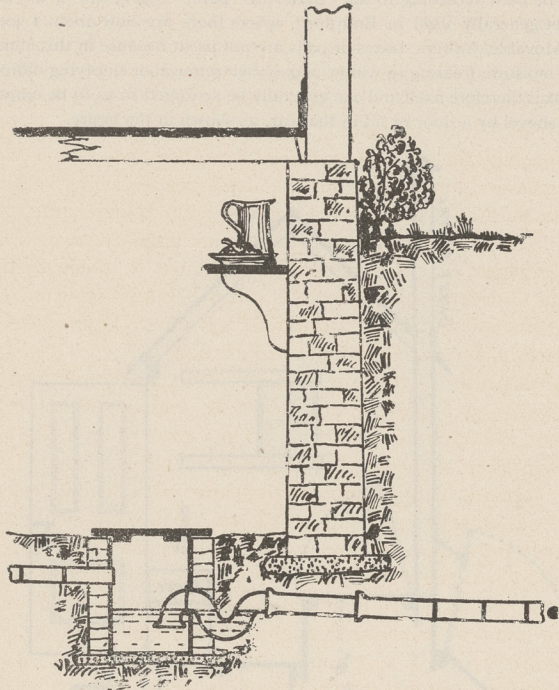


FIG. 4.

A small well or pit about 2 feet square and 2 feet deep should be built of brickwork about 2 feet from the cellar wall at the point of exit of the drain, this pit to serve as a small catch basin, preventing entrance into the street tile or basin tile of dirt, sand, or other foreign bodies. Into this pit the drain tiles (laid outside the foundation walls, and in wet, springy ground, under the cellar floor) should empty.

The exit should not be less than 18 inches deeper than the floor of the cellar.

In most cases it is desirable to place a trap on this drain as near the inlet as possible and a fine wire netting should be placed over the inlet.

The cheap cottage, renting at \$5 per month or less, has now been provided for.

THE KITCHEN SINK.

In houses renting from \$5 to \$12 per month, a kitchen sink is the only inside fixture required, the outside slop hopper being still retained for chamber slops, as well as the dry ash closet for nightsoil.

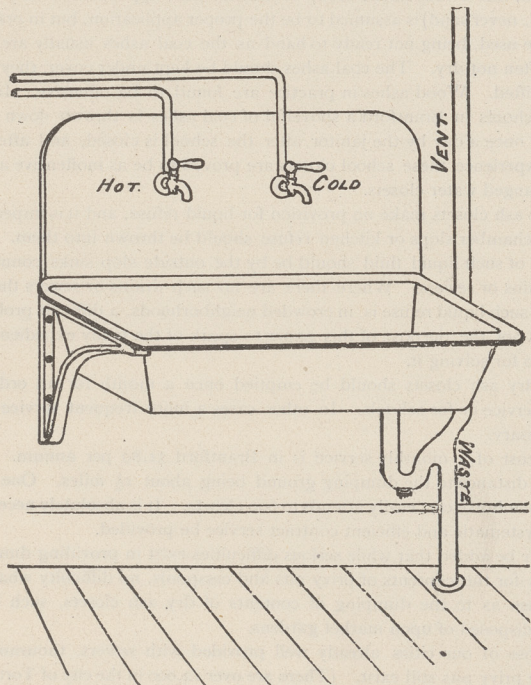


FIG. 5.

This sink should be of iron, preferably porcelain lined, properly trapped and the trap ventilated by a pipe not less than 2 inches in diameter, carried through the roof. The waste pipe should be of iron, well coated with asphaltum varnish, with screwed joints or run with lead and caulked. The house sewer should be four inches in diameter, of vitrified salt-glazed sewer pipe, except for five feet entering the wall of the house which should be of cast iron "extra heavy" soil pipe 4 inches in diameter.

The ordinary cast iron sink of the hardware shop, if it has a proper fixed strainer, and if properly supported, and if kept well painted, is perfectly safe and is cheap. Galvanized iron or pressed steel sinks and porcelain lined sinks are better but more expensive.

WATER CLOSET.

In houses renting for more than \$12 per month a water closet should be substituted for the outside slop sink and the dry-ash closet, this one fixture combining in itself water closet, urinal and slop hopper.

This fixture should be of strong earthenware with all parts easy of access, so that need of cleansing may be apparent to the eye before any other sense is cognizant of the fact.

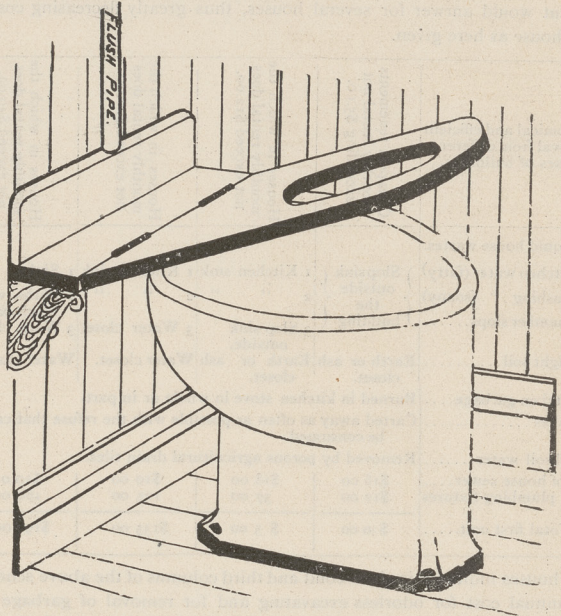


FIG. 6.

The closet above shewn is one of the best of the cheaper closets in the market. It has a broad base, thus being not easily loosened by rough usage. The "horns" for connections are very strong and well proportioned, thus not easily broken off by carelessness or by accident. The outlet is at the front—not obstructed in any way by bends—thus allowing of instant inspection and easy cleansing. The flush is thoroughly effectual and not spattering, as many otherwise good closets unfortunately do. This closet is of so heavy and strong a design that no supports are necessary for the seat, which rests directly on bowl, but rubber cushions should be placed on lower side of the seat. The hinged seat should be counterbalanced to prevent danger from rough usage.

No part of closet pipes or connections should be encased with any wood-work whatever. The wooden seat as shown is all the woodwork required.

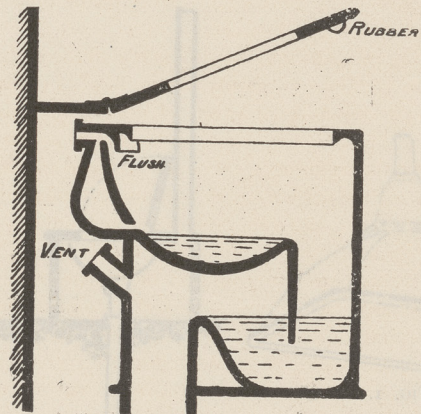


FIG. 7.

The water closet compartment should be well lighted and ventilated by a shaft extending from the ceiling over the fixture to the outer air, to the "cock loft" of the building, or to a flue or chimney; this shaft to be not less than 40 inches in area.

In any building or house only two fixtures are absolutely necessary for the removal of liquid household wastes and the excreta, viz.: the water closet and the kitchen sink; and except for the great inconvenience the water closet could be made do for both.

In choosing a water closet avoid "pan closets," "plunger closets," "valve closets" and "hopper closets." A simple washout closet in one piece, with front outlet, is the best closet of moderate cost now made.

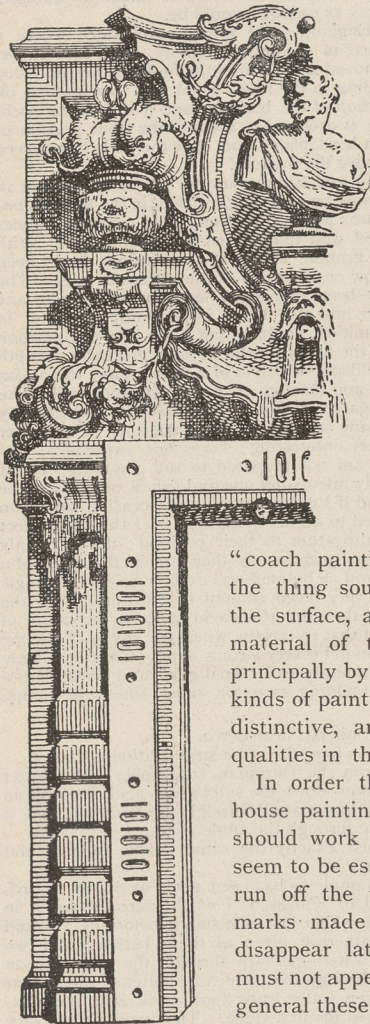
OTHER FIXTURES.

The addition of baths, wash bowls, laundry tubs, etc., are conveniences, not necessities; but in putting in a soil pipe "stack" connections should be left for bath at least, and for any other fixtures that will probably be added within a few years. These connections should be securely plugged.

The fewer and more simple the fixtures are, however, the less becomes the possibility of danger from poor plumbing, and the less the first cost and annual maintenance.

RECREATION AND FURNITURE

THE WORKING QUALITIES OF PAINT.*



PAINTING may be divided, according to the use to which the paint is put, and especially according to whether it is expected to protect a surface or not, into two classes. The first of these classes is generally known under the head of "house painting," and covers the painting of all surfaces, where the paint itself is not only expected to give the appropriate color that is desired, but also to protect the surface against the weather. The other kind

of painting is known as "coach painting," in which the color is the thing sought for, the protection of the surface, and also of the coloring material of the paint, being secured principally by the varnish. These two kinds of painting are characteristic and distinctive, and both require different qualities in the material to be used.

In order that paint, to be used for house painting and analogous purposes, should work well, two or three points seem to be essential. First, it must not run off the work; second, the brush marks made during application must disappear later; and third, the work must not appear spotted or streaked. In general these qualities are obtained by what is commonly known as proper

mixing, although the grinding, the purity of the oil, and the kind of dryer used all have influences.

The running of paint may be due to two or three causes. The paint may be applied too thickly for the kind of paint used; for example, to put on as thick a coat of very thin paint as paint containing a larger percentage of pigment would inevitably result in the paint running. Of course linseed oil alone can be applied to a surface with a brush without running, provided too much is not put on, and the greater the percentage of liquid in a paint, the thinner the coat must necessarily be. This application of thin coats is a very common fault, especially in contract painting. Where the pigment is strong in coloring and covering power, the temptation is to put on very thin coats, which temptation is increased by the fact that thin coats dry quicker than thick ones. Of course with proper care in using a very thin paint, there need be no difficulty from running. Another cause which may lead to running is want of proper grinding. The finer and better mixed the pigment and liquid are, the less the tendency to run. A paint mixed up by simply stirring the dry pigment into the liquid, is more apt to run than one which has been ground. The oil leaves the coarser portions of the pigment, and carries off the finer portions with it, resulting in streaks down the work. With proper proportions between the liquid and pigment, this difficulty can be obviated, but some pigments, as is well known, cannot be ground, and are therefore always used by simply mixing with the liquid, but a paint otherwise good and properly proportioned may give difficulty from running if it was not finely enough ground. Still another cause of running is too long a time after the paint is put on before it sets. We have mixed up two paints, one of which would take a set, although not dry, in from six to eight hours, and another

which would not take a set in twice that time, the amount of pigment and liquid and the grinding being exactly the same, and the second would run, while the first would not. It is very easy to see why this should be so. A thin layer composed of liquid and pigment, maintaining its limpidity, and being in a vertical position for a long time, will run off from the surface more readily than one which does not maintain its limpidity, although other things are the same. The paint which takes a set, thereby losing its limpidity, resists the strain which produces the flowing or running in the other paint. Adulterated oil, especially linseed oil containing petroleum product, is liable to this same difficulty, and for the same reason, namely, the oil on the surface maintains its limpidity for a long time, thus giving gravity a long time in which to act upon the paint. The obvious remedy for running due to this cause is to use such an amount of dryer, with pure oil, that it will take a set from four to eight hours, and where the difficulty is due to adulterated oil, the remedy is apparent without explanation.

The difficulty of the brush marks remaining prominent in paint is largely a question of the relative amounts of liquid and pigment, although not wholly so. The nature of the liquid used comes in as an element. For example, if a large amount of very thick Japan is a constituent of the paint, or a heavy, viscous, boiled oil, other things being equal, the brush marks will have a tendency to be more prominent than where raw linseed oil and a limpid Japan are used, but the proportions of liquid and pigment are, nevertheless, in all cases the important consideration. If the liquid is viscous and sluggish in movement, less pigment is required; with a very limpid liquid more pigment can be used without causing the brush marks to be prominent. It is also quite probable that the grinding has an influence on the degree of permanence of the brush marks. Coarsely ground paint, under no circumstances, would allow the brush marks to flow out as readily as where the pigment is in a very fine state of division, and with that perfect union between the pigment and the liquid which is produced by fine grinding.

Streaked or spotted painting may be due to two or three causes. It often happens that the pigments made use of are what may fairly be termed "composite," by which is meant different chemical substances constitute pigments, and often in cases where the pigment is nearly all one chemical substance, as in chrome yellow or white lead, it frequently follows that materials made at different times differ in both shade and fineness, but are subsequently mixed together. In all cases where a pigment is composite our experiments seem to indicate that there is a tendency for the very finest particles to separate from those which are coarser, so that each successive brushful taken out of the bucket may contain a larger percentage of the fine, and a smaller percentage of the coarse particles than the previous brushful, at least while the first half of the bucketful is being used out. In some paints it is actually noticeable that the last end of the job is of a different shade from the first, especially if the painter has not stirred his bucketful of paint frequently. This separation of the different constituents of the paint is also especially true of those composite pigments which are made up of some heavy basis, with some organic or light coloring matter; for example, Tuscan red, which, as is well known, is a mixture of oxide of iron known as Indian red, with some of the red lakes. It may fairly be claimed that this difficulty of spotted or streaked work is more a question of care on the part of the painter than of the proper mixing or proportioning of the paint, and this is to a certain extent true, but it is not wholly so. Poorly ground paint is especially liable to give streaked results, and no amount of subsequent stirring or mixing on the part of the painter will make a pigment consisting of very coarse and very fine particles a good one to spread, or make it give a good-looking job. Both fine grinding and great care on the part of the painter are essential to obviate this difficulty. It of course goes without saying that those pigments which, from their nature, have a tendency to produce this difficulty should not be mixed where it can be avoided, although in our belief fine grinding will almost entirely overcome it with any pigments, whatever they may be.

It will be observed from above discussion that the essentials of good working house paints are fine grinding, pure oil, proper mixing, and the proper amount of dryer, together with good judgment and care on the part of the painter. Of these essen-

* Extracts from a series of articles on practical railroad information, the results of chemical and practical experiments, by C. B. Dudley, chemist, and F. N. Pease, assistant chemist, of the Pennsylvania Railroad. Published in the *Railroad and Engineering Journal*.

tials the grinding and the use of pure materials are incumbent on the parties furnishing the paint. The proper proportioning of the pigment and liquid, the use of dryer of the right kind and in the right amount, and the skill and care during the application, are incumbent on the foreman painter or his subordinates. It may be thought that in treating this subject of the proper application of the paint, the brush may be regarded as an essential element, and this undoubtedly does have an influence, especially in brush marks. However, our experience indicates that this element is less important than would generally be thought, as a skillful painter, even with a poor brush, will make a good job where an unskillful man with a good brush fails. We think it fair to say, however, that it is more wearisome to the arm, and more difficult to get good results with stiff brushes than with those which are more soft and pliable; also in our judgment there is very little economy in using poor brushes.

MANUFACTURES AND MATERIALS

WEATHERING OF BUILDING STONE.*

At the last annual Convention of the Ontario Association of Architects, Mr. Alan Macdougall, Chairman of the Toronto Branch of the Canadian Society of Civil Engineers, very kindly offered some remarks on the weathering of stones in buildings that had come under his notice.

Mr. Macdougall described also some ominous cracks that had occurred without any apparent reason in the tower of a church in St. John's, Newfoundland. The tower was built upon solid rock, and the only conclusion he could come to was that the corner of the tower had moved bodily, or in other words, slid upon the surface of the rock. Whatever movement had taken place was, however, arrested, and the building had been in the same condition it now was in for many years.

One result of Mr. Macdougall's investigations had been that he was certain imported stones did not stand a foreign climate as well as native stones. Stones found under certain conditions of atmosphere and climate were more capable of resisting disintegration under the same influences than stones found under different conditions. A building stone might be very excellent in its native country, but could not be trusted to withstand climatic influence of an entirely different nature to that of its own land.

Mr. Macdougall's remarks were very interesting, and led to a discussion, which we give below.

DISCUSSION.

The President: I am sure we are all very much indebted to Mr. Macdougall for his very interesting paper. It introduces a new feature in the discussion of building material from what we have been accustomed to.

Mr. Gambier-Bousfield: I rise to move a vote of thanks to Mr. Macdougall for his paper. I do so with special gratitude, because he is not a member of our Association, but he was kind enough to volunteer this paper because he knew it was a subject that would interest us all very much indeed; and it has been one which has given us cause for a good deal of thought, and I hope to hear from some of the members something more like the "Weathering of Stones." I should like to ask Mr. Macdougall if he has noticed the curious weathering of granite under frost and sun. There are two granite rock crosses standing in a small open space in England—I cannot just recollect the spot—and on the south side the sun has caused the granite to flake off to the depth of three quarters of an inch. The appearance is just like a tree trunk with pieces of bark pulled off. Those crosses have stood there probably for three or four hundred years.

Mr. Langton seconded the motion of thanks.

Mr. Billings: Did I understand that the crack went the whole way down in a straight line?

Mr. Macdougall: No, but almost a straight line.

Mr. Billings: It is possible there was a weakening in one stone first, and the other was cracked by pressure.

Mr. Macdougall: It must have been something of that kind. In that particular case there must have been some weakening somewhere to cause the first, because it would not be possible that you would have one cleavage generally running all through a number of stones; that is the curious part of it. Whether it is a weakness due to foundation I can't tell. The stone that forms the backing of the tower and the local stone has not given, and when you look at the wall of the cathedral you don't notice the cracking there, nor on the bishop's palace immediately adjoining.

Mr. Billings: Is it a stone that has some crystalline filling that is easily soluble by the humid air?

Mr. Macdougall: Of course it would be. Every stone has a certain cleavage plane, but you find what we technically call "dries" which comes out afterwards by the weather. The curious part of this was, there was such an immense deal of it.

Mr. Billings: There is a question I want to ask in connection with the efflorescence in Halifax, where they use so much of that brown stone. It was said to have been owing to the fact that the stone was taken from between high and low tide, and it was the salt that caused that very largely. I don't myself think it is so. I have the impression that the Halifax men have been content with the poorer qualities, and have shipped the best to Boston.

Mr. Macdougall: Is it a local stone?

Mr. Billings: That from Hopewell and Fairville. At Ottawa, in the balustrade of the steps of the Commons and Senate, the columns have gone the same way from efflorescence, and we thought it was from the sulphurous acid, because it was the Ohio sandstone that was used there. Now they are putting in bronze balustrades.

Mr. Macdougall: In the inside of the House of Commons?

Mr. Billings: No, the outside. They are putting in bronze balusters to support the Ohio sandstone rail, just owing to that cause. They have had several times to put in fresh Ohio sandstone because they never stood. I think our own Canadian sandstones and limestones are far superior to those from Ohio. We have in a great number of quarries in Canada very good stone, and still the people bring in stones from other countries, especially that Ohio sandstone, which behaves very badly in this climate.

Mr. Paull: Mr. Macdougall said the British Houses of Parliament were

built of Portland stone. I think that is a mistake. I think it is Yorkshire stone, and that there is no portion of the Portland stone in them. Might not those cracks in the stone be caused by temperature? Where there is a large stone space in an intense cold, say 20° below zero, the interior of the stone would be of that temperature; then if a sudden change should take place, say 15°, in the course of a short time the outside would expand, and by that sudden expansion and contraction I think it would be very likely that the stone would crack. Now, in making large castings it would be necessary to make preparation that the temperature should alter after a long period to prevent fracture. These stones would be subject to fracture, I presume, much in the same way as castings would be.

Mr. Belcher: I recollect in England some thirty years since where a tower similarly situated cracked in a similar manner, and Sir Gilbert Scott was called in and he removed a portion of the under tower and discovered the cause to be a rounding in the rock, which was not levelled off perfectly level with the imposition of the building and it slid on the rock. In looking at your sketch there, it occurred to me that the front portion of the tower might have been on a level plane, and that the rock just curved off where the wall exists, and hence the fracture.

Mr. Macdougall: I don't think you can account for the long fracture in any other way than that there must be some slight defect in the foundation. It may be that the foundation was not laid perfectly level, or some stones not being perfectly level cracked, and that caused the other crack. With reference to the weathering of granite, no great observations have been made so far as I personally know or my study of the question goes. The granite of this country has not been sufficiently long put up to make any close calculation or examination into it. There is no doubt a granite, in its perfectly pure geological definition, could be put down as a composition of quartz and feldspar, and it is the feldspar which really gives the strength to the granite. If you have a feldspar which is of a soft nature, the action of the weather will attack that, and through that disintegration will take place. The matter was investigated partly by Prof. Geikie and also by Prof. Pfaff, but neither came to any conclusion on the subject. The matter mentioned by Mr. Belcher is very interesting; I was not aware of it. As to the life of building stones, I am not prepared to say anything, but I think the question is an extremely interesting one and I shall certainly make it a point of study next year, and if I can on any future occasion give you any information I shall be pleased to do it. (Applause). I think the effect on the stones in Ottawa is due altogether to their position; that is exactly the position of those tombstones I mentioned—they are in the angle of a wall; and this stone I showed you as bulging was exactly so—in the angle of the wall. There you have a very large amount of moisture, with the action of the frost, and no doubt the sulphurous acid and also carbonate of oxide; because you have noticed that in certain winds the smoke from the buildings is blown down, and you get a very strong smell off a great many buildings of what you would commonly call "coal gas," and when that is blown down directly on to the building its action must affect the stone. That is Ohio stone, is it not?

Mr. Billings: Yes, it is from Amherst, near Berea.

Mr. Macdougall: I suppose it is from the same stratification of rock?

Mr. Billings: Yes, it is all from the Devonian sandstone. The water falling, no doubt, as you say, brings down the sulphurous acid, because in the fire-places they have bituminous coal all through the building, and a great broad stripe is visible down through the angle there.

Mr. Macdougall: That is just exactly the cause. The sulphur and carbon in it comes down and coats it.

Mr. Balfour: With such an example as has been given us on the board, with stone in the neighborhood of Kingston, I would account for it in altogether a different way. Taking that just as it stands before us, I would put this version on it. The weathering given us there between the two windows has on the start taken water—perhaps through the joint just on the coign. The water has gone through that stone and softened the mortar beneath it. The mortar has taken water from that crack, and the frost, expanding the mortar, has snapped the first stone. That would take place probably in some sudden change of weather. That would go on from month to month and year to year, and the water would follow that down until it came to the bottom. After going a certain distance below that belt again, the mortar being first softened, made sand of right under the belt, the stone next above it has a bearing on the inner corner and nothing on the outer. As soon as that goes down the weight is thrown on the corner, and that stone is snapped; and it will follow it up. We had an exact example of that in the Roman Catholic cathedral in Kingston. There is a tower there, and small ones on the corners, that cracked, and weathering was just exactly in that position; and I saw that thing going and followed it for ten or fifteen years, and I think there is no doubt that that is the way that went.

Mr. Dick: The instances of the weathering of stones that have been laid before us this morning, as well as the experience of most of us, go to show the great necessity of having a scientific investigation of all the building stones that we use, both native and imported. (Hear, hear). We have all seen instances of failure from using a weak stone where a strong one might have been had. I remember a case in my own experience on an arcade carrying considerable weight, granite columns and limestone caps. These caps crushed under the weight. I had the arches shored up, the caps cut out and replaced with red Credit Valley stone about the same size as the original cap. This stood the weight perfectly, and stands to this day without a sign of a crack or failure. Mr. Macdougall will recollect the parish churches of Edinburgh, which were built of Leith stone—a stone which was very soft when it came from the quarry, but in the course of a few years became so intensely hard that no stone-cutter liked to cut it. After sixty or seventy more years every course on those churches was as sharp as the day it left the quarry, while on other buildings made of local stone, they had become quite soft and ragged. I never could understand why the balusters at Ottawa should have gone the way they did unless the disintegration arose from the way they were placed on the top of the landing, where they were exposed to chemicals being brought down from the atmosphere or from the roof—more probably they washed down from the soot deposited on the roof. I do not see any other way of accounting for it, unless it may be that some chemical such as salt has been used at some time on the steps to melt the ice at certain times. Salt might be injurious. However, there is another circumstance that has been frequently observed in England and Scotland, and that is, that a stone always wears best in the district in which it is quarried. (Hear, hear). Many instances have been noticed of stone taken to London, where there is no building stone in the neighborhood—taken from the North of Scotland, for instance—which would not stand well in London, though it stood well in its native district. Of course that might be accounted for by the amount of sulphurous acid and other chemicals in the London atmosphere; but still it seems to be a matter of fact that a building stone does stand best in the district in which it is quarried. We are rather unfortunately situated in that respect in Toronto, in so far as we have nothing but intractable stone to work, and are therefore dependent on our neighbors; and the stone must be brought, too, a very considerable distance from its native district before we can use it; therefore it is not likely that it will stand as well as it would have done

* Abstract of paper read at the Third Annual Convention of the Ontario Association of Architects, by Mr. Alan Macdougall, C. E., and discussion thereon.

in its native district. However, the whole discussion seems to point to this conclusion: That the School of Practical Science, in which we are now meeting, ought to have that department put into efficient working order just as soon as possible, so that whenever any building of any importance is to be erected we can call upon that department to give us a chemical and scientific analysis of the stones, as well as test them for crushing strength, so that in buildings that are intended to be permanent monuments, nothing will be used but stone that will stand the test of time and the effects of weather, and all other influences to which it may be subjected. (Hear, hear, and applause.)

Mr. Rastrick: I wish to correct an observation made by Mr. Macdougall that the British Houses of Parliament are not limestone. Sir Chas. Barry, in conjunction with eminent geologists, published a voluminous report on the question. This report can be obtained from the parliamentary offices in England. Local stone always wears best in the locality where it is got. The local stone from which the House of Parliament is built is the most perfect stone in the district. There are churches there that have existed five or six hundred years. There are a great number of houses that have been built even from the first William of Great Britain; yet in the Houses of Parliament that stone disintegrated about the third year it was put up—especially in the upper parts—evidently from the effects of the atmosphere. There was great commotion at the time, and serious charges were brought against the Commission and all concerned in it. But it was no fault of theirs. They had taken the precaution of ascertaining the stability and the longevity of the stone. They had visited all the quarries in Great Britain, and the specimens were analysed and reported upon. There is no doubt about the stone chosen being considered to be the best. There are no stones perfect, as we think, for our purposes. There are stones in Canada which may be utilized at less cost than stones imported from the States. Some twenty-five years ago I was sent to inspect a quarry on an island just above Lake Simcoe, and I found the stone first-rate marble of a very close, fine texture. I think we can obtain stone in Canada that is far better than they have in the States, for this reason—most of the sandstone formations are from geological deposits which have not had that pressure upon them which the stones in Canada have had. I think we can do better by using our own stone after having it examined.

Mr. Curry: I should like to bring this discussion to a point by moving, seconded by Mr. D. B. Dick, "that it be an instruction of this Convention to the Council that they shall take such action as they may deem best to determine the quality and value of the building stones which are being used in this Province." We are using stones without having much knowledge of their qualities, and we are now in a position where we can obtain some knowledge both chemically and also as to the constructional value of the stones we are using. This Science School will have before long a plant by which they can test the stone. I don't think we should as architects use a stone without some knowledge of what it will carry, and its length of life. Of course, the Council take it up simply as a business matter, because they may be able to employ some one or two persons and pay them for doing this work and let them report. I have no doubt that authorities of the School here would be only too pleased to give any assistance they can, and possibly we may be able to obtain some assistance also from the Ontario Government in the matter; but whatever is necessary to be done can be done by the Council. I think the Council should pay for a certain amount of this work being done, then each member should send in any information he may have of defects in stones, or anything which may strike him as of value to a Committee investigating the value of stones. Mr. Townsend wants to suggest sending in samples as well. Mr. Macdougall's paper is very valuable, and has brought up a very instructive discussion. (Applause.)

The resolution of thanks to Mr. Macdougall was put and carried, and Mr. Macdougall briefly responded.

Mr. Curry's motion was being put, when Mr. Billings said: Stone includes sand and clay, and lime and cements.

The President: And all building material.

Mr. Billings: There is no doubt that sand is stone, and lime is a product of it, and so also is cement.

Mr. Curry: We can find out a great deal as to limestones and cements from standard authorities, but we can find out nothing about our local stones.

Mr. Curry's motion was carried unanimously.

HOW TO MAKE A GOOD FLOOR.

A SOUTHERN contemporary, the *Lumberman*, gives a few rules for laying a floor, which for so apparently simple a job may sound somewhat silly. The directions are justifiable, however, from the fact that there are many alleged carpenters who do not know how, or are too lazy, to lay a floor properly:

"The best floor for the least money can be made of yellow pine, if the material is carefully selected and properly laid. First, select edge-grain yellow pine, not too 'fat,' clear of pitch, knots, sap and splits. See that it is thoroughly seasoned and that the tongues and grooves exactly match, so that when laid the upper surfaces of each board are on a level. This is an important feature often overlooked, and planing-mill operatives frequently get careless in adjusting the tongueing and grooving bits. If the edge of a flooring board, especially the grooved edge, is higher than the edge of the next board, no amount of mechani-

cal ingenuity can make a neat floor of them. The upper part of the groove will continue to curl upward as long as the floor lasts.

Supposing, of course, the sleepers, or joists, are properly placed the right distance apart, and their upper edges precisely on a level and securely braced, the most important part of the job is to 'lay' the flooring correctly. This part of the work is never, or very rarely ever, done nowadays. The system in vogue with carpenters of this day of laying one board at a time, and 'blind nailing' it, is the most glaring fraud practiced in any trade. They drive the tongue of the board into the groove of the preceding one by pounding on the grooved edge with a naked hammer, making indentations that let in the cold air or noxious gases, if it is a bottom floor, and then nail it in place by driving a six-penny nail at an angle of 50 degrees in the groove. An awkward blow, designed to sink the nail-head out of the way of the next tongue, splits the lower part of the groove to splinters, leaving an unsightly opening. Such nailing does not fasten the flooring to the sleepers, and the slanting nails very often wedge the board so that it does not bear on the sleeper. We would rather have our flooring in the tree standing in the woods than put down that way.

The proper plan is to begin on one side of the room, lay one corner of boards with the tongue next to, and neatly fitted to, the wall (or studding, if a frame house), and be sure the boards are laid perfectly straight from end to end of the room and square with the wall. Then nail this course firmly to the sleepers, through and through, one nail near each edge of the board on every sleeper, and you are ready to begin to lay a floor. Next, fit the ends and lay down four or six courses of boards (owing to their width). If the boards differ widely in color, as is often the case in pine, do not lay two of a widely different color side by side, but arrange them so that the deep colors will tone off into the lighter ones gradually. Push the tongues into the grooves as close as possible, without pounding with a hammer, or, if pounding is necessary, take a narrow, short piece of flooring, put the tongue in the groove of the outer board, and pound gently on the piece; never on the flooring board. Next, adjust your clamps on every third sleeper and at every end joint, and drive the floor firmly together by means of wedges. Drive the wedges gently at the start and each one equally till the joints all fill up snugly, and then stop, for if driven too tight the floor will spring up. Never wedge directly against the edge of the flooring board, but have a short strip with a tongue on it between the wedge and the board so as to leave no bruises. Then fasten the floor to the sleepers by driving a flat-headed steel wire nail, of suitable size, one inch from either edge of every board, straight down into each sleeper. At the end-joints smaller nails may be used, two nails in board near the edges and as far from the ends as the thickness of the sleeper will permit. Proceed in this manner until the floor is completed, and you will have a floor that will remain tight and look well until worn out."

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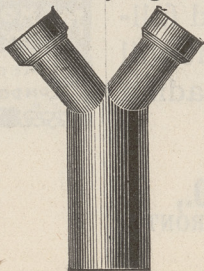
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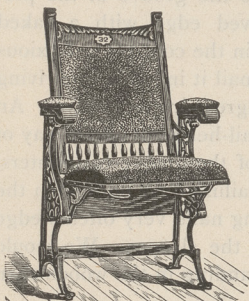
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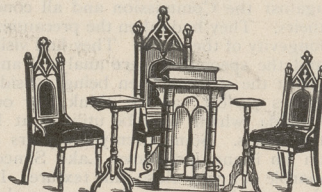
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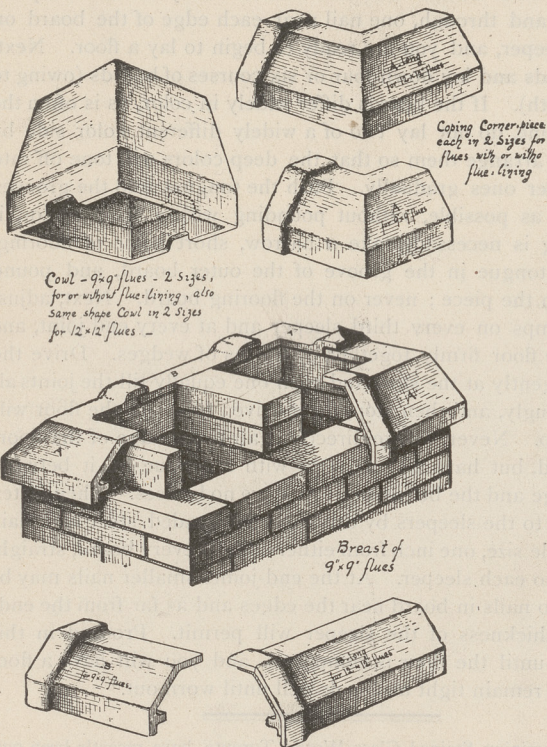
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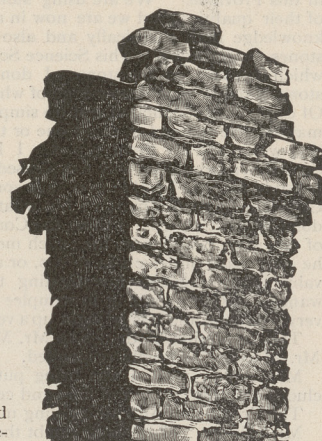
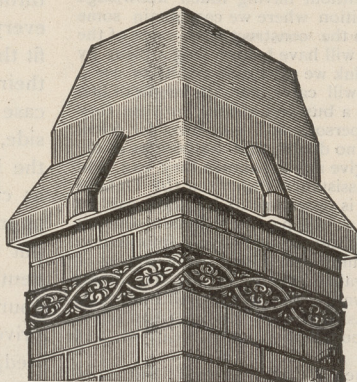


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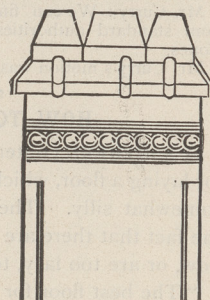


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